



June 2, 2009

Mr. Steve Faryan
On-Scene Coordinator
U. S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604

**Subject: Interim Remedial Action Plan
Mallard North Landfill**

Dear Mr. Faryan:

On behalf of the Forest Preserve District of DuPage County (FPD), RMT, Inc. (RMT) has prepared this Interim Remedial Action Plan (Plan). The Plan addresses certain environmental issues at Mallard North Landfill (MNL) that were discussed during our May 28, 2009 meeting.

1. Landfill Gas Migration and Emissions Control Pilot Study

Additional probes are being installed to assess the potential for off-site landfill gas (LFG) migration as described in the revised workplan submitted to U.S. EPA on May 5, 2009. If areas where off-site migration might occur are identified, LFG control measures for these particular areas will be evaluated.

In the interim, the landfill gas migration and emissions control pilot study (LFG pilot study) will evaluate solar flares as a technology to control LFG migration and reduce LFG emissions from the MNL. RMT proposes to install three (3) LFG flare units on existing vent pipes that will be selected based on LFG measurements. The three locations are proposed at this time as a pilot test to determine the effectiveness of the solar flares. There are several vents onsite that have the required minimum of 30% methane; however, there are only a couple vents that periodically meet the required minimum of 0.5-inch water column (2 cfm) of positive pressure to sustain reliable combustion. Based on conversations with the flare manufacturer, flare operation is very inconsistent at levels below these minimum values.

Table 1 presents the methane and pressure readings that have been taken over the past 2 months at various vent locations within the landfill. Note that on March 11, 2009 a day after the vents were capped, no positive pressure was recorded at any of the vents, except for DV-13 (+0.02-inch water column and 0% methane). This further points to the importance of determining the effectiveness and reliability of solar flares and solar blowers at a few select locations prior to installing more units.

The FPD is proposing to install solar vent flares at vents UAV-1/DV-1 (flare will be installed at DV-1 and piping will direct landfill gas from UAV-1 to the flare installed on DV-1), DV-3, and DV-8. These locations consistently have the highest methane concentrations and positive pressure readings. The blower will be installed at either DV-3 or DV-8. Shallow gas vent SV-12 will be capped this week and monitored to determine whether the developed methane content and pressure meet the minimum requirements to sustain combustion. If suitable for combustion, a flare may be placed at this location, instead of DV-3.

There are two manufacturers of the flare units and the costs of the units are very similar. The Landfill Service Corporation (LSC) flare was selected because this model is specified for lower LFG flow and methane content than the competitor's smallest model.

The LSC model CF-5 (see Attachment A) is specified to operate with a minimum of 2 cfm at 30% methane, by volume, and at a positive pressure (produced by the landfill) of 0.5 inches of water column (WC). Since it is likely that MNL is producing low quantities of LFG, the flare supplier suggested that the optional blower system might provide minimal benefit. The blower system is designed to only improve the pressure of the gas to the flare slightly, and is dependent on the amount of gas coming from the landfill. Therefore, the manufacturer suggested trying one blower system to determine if it is beneficial. If the blower system is deemed to be beneficial a blowers can be added to the other flares at a later date.

Each flare and blower system is self-powered using batteries that are recharged with solar panels. Each system may need insulation and additional guy-wire support for support during windy and winter periods.

2. EW-L2 Leachate Pumping Plan

The EW-L2 Leachate Pumping Plan (EW-L2 LPP) has been prepared to address the U.S. EPA's concern that an appropriate leachate level be maintained continuously in leachate extraction well EW-L2. Currently, leachate is pumped manually to a tanker truck on a periodic basis in an attempt to maintain the leachate level at approximately 12 feet below ground surface. This approximate maintenance level has been established to control leachate seeps occurring along the MNL perimeter near well EW-L2.

The EW-L2 LPP involves automating the pumping operations so a specified leachate maintenance level can be achieved on a continuous basis based on the installed elevation of the proposed pump. The maintenance elevation can be adjusted, if necessary, based on observed responses in the landfill seeps. This system will also provide the FPD with greater flexibility in providing tanker trucks to remove leachate from an installed aboveground storage tank and haul the leachate offsite for disposal.

The EW-L2 LPP materials include a single dedicated pneumatic leachate extraction pump for EW-L2 (see Attachment B), a rented 21,000-gallon storage tank with secondary containment system, an air compressor (230-volt, single-phase unit), and an electrical generator. Incidental materials include a wellhead and piping to connect the pump discharge to a forcemain extending to the storage tank. The tank will include equipment to allow tank trucks to off-load leachate from the storage tank.

Additional equipment may be necessary to provide for extended operation of the EW-L2 LPP system. This may include a small structure adjacent to EW-L2 to house the pump system controls, an air drying system (if winter operation is deemed necessary) and the compressor and generator. Some minor grading and the addition of gravel will be necessary for the storage tank and its containment and load-out system. Simple level controls in the tank to terminate pumping if the tank becomes full are recommended to reduce the need for daily checks of tank level.

3. Leachate Seeps Action Plan

A number of seeps have been identified around the perimeter of the MNL (see Attachment C for approximate locations that had been identified as of the May 28th meeting). At the May 28th meeting, U.S. EPA requested that the FPD perform a systematic inspection of the site to determine if other seeps exist. That inspection is occurring this week and if new seeps are identified, they will be addressed appropriately. The U.S. EPA has requested that the seeps be addressed such that the potential for discharge to the West Branch of the DuPage River (WBDR) be reduced or eliminated. RMT has identified possible corrective measures and has prepared this Leachate Seeps Action Plan (LSAP) to gather the necessary information and to select and implement the appropriate measures.

The following subsections address specific seep areas. In addition, the FPD is interested in regrading portions of the landfill to eliminate surface water ponding and thereby reduce the potential for seeps. A separate plan for regrading will be submitted to U.S. EPA after regulatory issues have been resolved. The FPD has submitted information to the County of DuPage that will allow them to determine if the FPD is exempt from County requirements related to regrading. Also, the FPD is interested in the outcome of discussions between U.S. EPA and the U.S. Army Corps of Engineers.

Southwestern Corner and Western Perimeter (Seeps 1, 2, 3 and 4; Seep near G-116)

There are several seeps that do not have existing control manholes, wells, or structures in place or available for use. Therefore, the following approach will be taken to address the seeps:

- Seeps will be surveyed and mapped for elevation and coordinate location. This information will be correlated with measured leachate head elevations in MNL monitoring points; and information will be used to design and construct shallow leachate collection trenches (with sumps) to eliminate the seeps, to collect intercepted leachate, and to pump the leachate to the storage tank.

- Install a pneumatic pump within each sump and pump collected leachate to the storage tank described in Section 2. Interim pumping will take place initially using single-walled HDPE pipe laid on the ground surface. Modifications to this system will be made, as appropriate, based on results of interim pumping. An alternative approach (depending on difficulty in running overland piping) is to locate a poly-tank at an individual seep, pump to the poly-tank and periodically empty the poly tank. Each approach will be evaluated on a seep-specific basis.
- RMT will also evaluate the potential for the storm sewer that runs along the western perimeter of MNL to create seeps. In 1996, this storm sewer (reportedly to be constructed of bell concrete) was observed to be leaking and causing erosion of the slope west of MNL. This storm sewer is located on an easement granted by the FPD to Elgin School District U-46 and the school district is responsible for maintenance of this storm sewer.

Southeastern Corner (Seeps 5, 6 and 7)

During the May 21, 2009 site visit, RMT observed that these seeps no longer had liquid present, possibly due to the leachate pumping from EW-L2. It is expected that the enhanced pumping system described in Section 2 will address these seeps.

Eastern Perimeter (Seeps 8 and 9)

There is a seep in the vicinity of manhole MH-2 and another seep near Probe G-110. Manholes MH-1 and MH-2 were believed to be access points for a collection system (gravel filled trench with perforated pipe) that runs between the two manholes and possibly to the south of manhole MH-2 all the way to the vicinity of well G-112S/D (based on figures produced by EMCON). Recent conversations with a former FPD employee indicate that the manholes might be tied to a drain system in the northeastern corner of the landfill also. Efforts to obtain additional information are ongoing. The following activities will be performed to address this area:

- Gather existing condition information for MH-1 and MH-2 and the reported collection system. Each manhole includes a riser that will be accessed with a video camera to determine construction details and condition. The video camera will also be used, if possible, to assess the extent and condition of any horizontal piping that extends outward from the manholes.
- Install a pneumatic pump within one or both manholes (most likely a pump will be installed in MH-2) and pump collected leachate to the storage tank described in Section 2. Interim pumping will take place initially using single-walled HDPE pipe laid on the ground surface. Modifications to this system will be made, as appropriate, based on results of interim pumping.
- The existing surface water pond(s) on the surface of the MNL along the eastern and southern sides of the MNL will be surveyed. Information will be used to assess possible dewatering actions (potentially drain tiles or changing surface grades) to allow the water to freely drain from the affected areas. Eliminating standing water will reduce recharge and potentially seeps.

4. Electrical Utility Service Evaluation

As discussed during our May 28th meeting, the FPD will investigate whether power can be restored to the site, given that it appears the on-site breaker was placed out of service only about one year ago. Depending on the results of that inquiry, RMT may contact the local electrical utility provider to determine the feasibility and costs associated with installing power to the southeast area of the MNL, near EW-L2 and to the northwest corner of the MNL, just south of the entrance gate.

This effort includes contacting the utility, meeting on site to discuss potential options, and receipt of cost estimates from the utility. This effort will be useful in determining costs, and what type of power can be made available for future considerations.

5. Video Evaluation of Selected Existing MNL Risers

Boring logs and well construction information is apparently not available for a number of existing riser vents and/or wells and as-built information for these select features may be important to the ongoing efforts at the site. RMT proposes to perform video-logging of select riser pipes on the MNL to determine riser construction details and condition. The risers could be used for future monitoring/remedial efforts. RMT has tentatively identified the following locations for video-logging: EWL-10, 11, and 12; MH-1 and 2; and UAV-1, 2, and 3. Additional points may be added as appropriate.

6. Schedule

The FPD requests that U.S. EPA provide written approval of the activities discussed in this letter. As discussed during our May 28, 2009 meeting, the FPD can then authorize funds to perform these activities on short order. Some of the critical components of these interim actions have lead times for acquisition. For example, the pneumatic pumps have lead time of approximately 10 to 14 days and the solar flares have lead times of approximately 21 days. Upon receiving U.S. EPA approval, the FPD will order equipment and immediately begin implementing the actions described in this letter.

If there are any questions on this letter, please contact me at 312-575-0200 or al.schmidt@rmtinc.com.

Sincerely,

RMT, Inc.



Alan J. Schmidt
Project Manager

Attachments: Table 1 – Methane and Pressure Data from Select Monitoring Points Within MNL
Attachment A – Solar Spark Vent Flares Information
Attachment B – QED Air-Powered Pump Information
Attachment C – Landfill Seep Locations

cc: Walter Nied, U.S. EPA
Jacob Hassan, U.S. EPA
Tom Rivera, Illinois EPA
Carol Fuller, Illinois EPA
Omprakash Patel, Weston Solutions, Inc.
Joe Benedict , Forest Preserve District of DuPage County

Table 1
Methane and Pressure Data from Select Monitoring Points Within MNL
Mallard North Landfill

Vent	3/11/09		4/8/09		5/7/09	
	CH4 (%)	Pressure (" H ₂ O)	CH4 (%)	Pressure (" H ₂ O)	CH4 (%)	Pressure (" H ₂ O)
EWL-10	0.4	0.00	41.6	0.00	42.8	-0.06
EWL-11	68.4	0.00	69.5	0.00	69.2	+0.04
UAV-1	78.2	-0.10	72.1	+1.60	67.4	+1.70
DV-1	70.8	-0.18	69.8	+0.65	66.1	+0.55
DV-6	12.2	0.00	5.0	0.00	36.0	0.00
DV-13	0.0	+0.02	0	0.00	1.1	0.00
DV-12	0.9	0.00	71.3	+0.02	69.2	0.00
DV-8	70.5	-0.06	74.2	+0.10	73.1	+0.35
DV-3	0.0	-0.04	78.4	+0.25	78.7	+0.06

Attachment A
Solar Flare Information

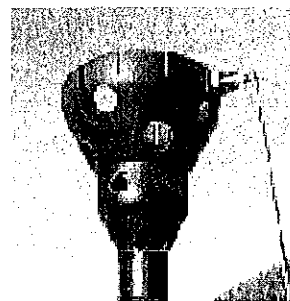
Need to Control Gas Odor?

SOLAR **Spark**®

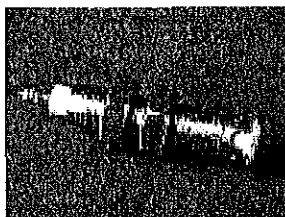
V E N T F L A R E S

Solar Spark® Vent Flares are simple, reliable solar ignited flares for direct mounting on all types of landfill gas vents to destroy foul odors associated with flammable gas emission.

- ◆ Patented flarehead operates with variable gas quality and flow rate even in high winds



- ◆ Solar panel with battery delivers continuous spark ignition in cloudy or dark conditions



- ◆ Patented Spark-Pilot™ provides reliable reignition in rainy weather

Economical Solar Spark Vent Flares offer years of dependable and trouble-free operation



Landfill Service
CORPORATION

800-800-7671

www.landfill.com



SPV-587 Solar Powered Vacuum

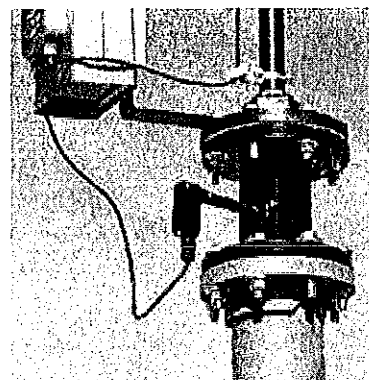
for use with

SOLAR **Spark**®

V E N T F L A R E S

The Landfill Service Corporation SPV-587 is an in-line fan that assists in the ventilation of landfill gasses. In conjunction with our Solar Spark Vent Flare, this unit efficiently removes gasses collecting in the immediate area of the flare.

- ◆ Reduces gas migration
- ◆ Easy to install



- ◆ Requires no external power
- ◆ Operates continuously in all conditions

The SPV-587 Solar Powered Vacuum offers you the same quality and dependability as our other Solar Spark Vent Flare products.



Landfill Service
CORPORATION

800-800-7671
www.landfill.com

SPV-587 Solar Powered Vacuum

for use with



BRIEF SPECIFICATIONS

Solar collecting Photovoltaic (PV) panel

20W peak power / 16.8V peak voltage / 1.19A peak current rating

SunSaver-6 Pulse Width Modulation (PWM) constant voltage battery charging system controller

12 Volt rechargeable sealed lead acid battery

50 AH @ 20HR rate. Spill proof and maintenance free.

DC Axial waterproof fan, 12V / 32mA / 3000 RPM / 58.7 CFM

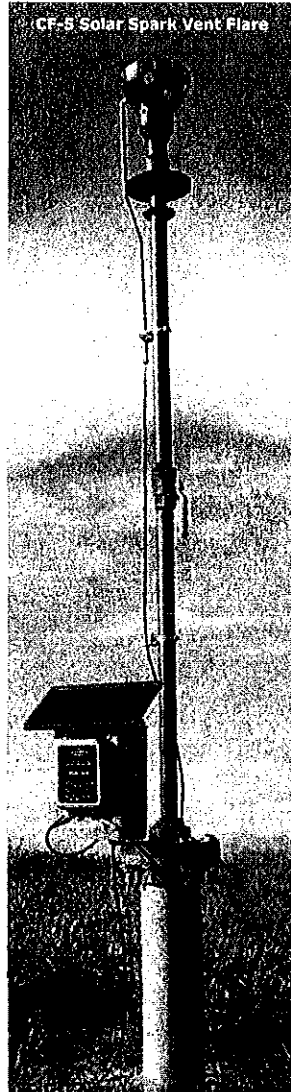
Mounted and sealed within a steel housing. Standard housing is equipped with 4" x 9" flanges.

NEMA 4 control panel

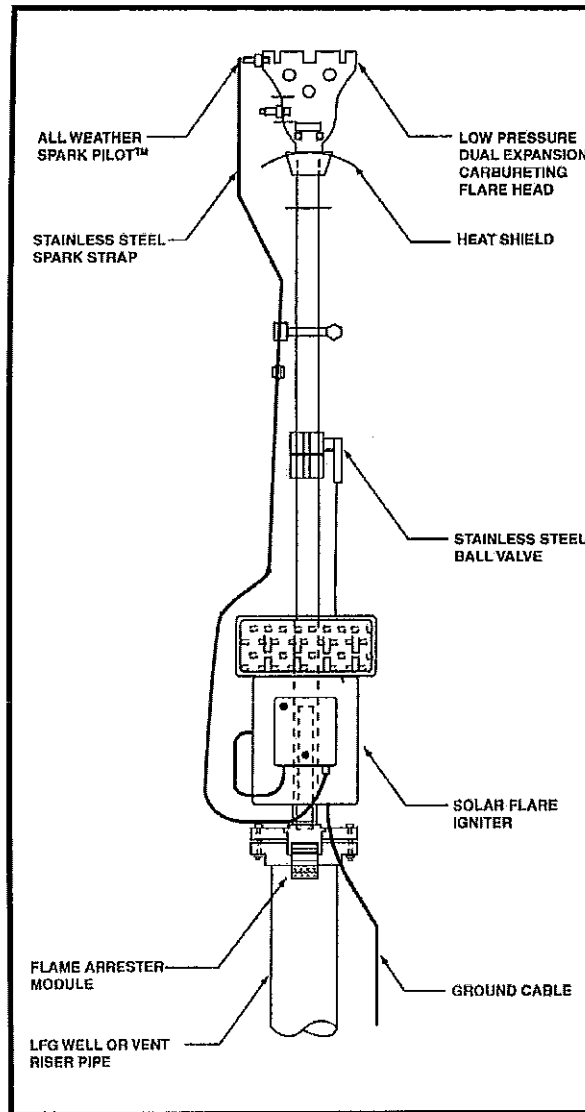
The control panel houses the battery, voltage controller, and all other necessary components. A waterproof rocker switch and twist lock connectors are mounted on the bottom of the panel for ease of installation and operation. The clear lens cover allows monitoring of systems functions without opening the panel. All circuits are protected by two "Push Button" circuit breakers.

Detailed, individual component specifications are available upon request and are included with each unit when purchased.

CF-5 Solar Spark Vent Flare



Typical Installation



Model CF-5(6V)

Capacity: 2-90 SCFM



Model CF-10(12V)

Capacity: 5-140 SCFM

LANDFILL SERVICE CORPORATION

PRODUCT SPECIFICATION DATA

U.S. PATENT NOS. 5,957,681; 5,984,668

Revised: 8 AUG 03

PRODUCT

CF-5 Landfill Gas Vent Flare with SFI-100 Solar Igniter for 6-volt system or SFI-200 Solar Igniter for 12-volt system.

APPLICATIONS

For use on landfill gas vents, wells or leachate system cleanout lines to combust flammable gases at low ambient pressure without need for blowers or external power. Similar applications exist on wastewater treatment and biogas facilities and petroleum or natural gas production and transmission installations.

BRIEF DESCRIPTION

Standard unit includes solar-powered, continuous ignition system, all-weather variable flow flarehead, inline flame arrester, 1½" stainless steel ball valve, Schedule 40 black steel piping and 4" black steel bushing at base. Optional equipment includes various flange base adapters and cold weather insulation kits. Guy wire kits are also available. Pre-engineered flarehead modification parts can be provided to handle elevated gas pressures or flow rates.

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www.landfill.com

REGULATORY APPROVAL STATUS

The CF-5 vent flare has received approvals for use at landfills in many states.

Regulations vary from state to state; however, environmental comparisons always favor combustion over release of raw gas.

When properly maintained and operated, this unit is consistent with gas-flow and operating requirements specified at 40 CFR 60.18 and 40 CFR 60.33c. USEPA has determined that these regulations require addition of a thermocouple and flame pilot for compliance at NSPS/EG landfill sites. These parts are available as optional accessories.

ENGINEERING SPECIFICATIONS

I. SEI-100 SOLAR IGNITION SYSTEM (6-volt system)

SOLAR COLLECTOR: 6" X 13" Solar-electric trickle charge plate; 5W panel providing 10V peak with 8V at 300mA normal charging power

BATTERY TYPE & VOLTAGE: 6-volt rechargeable gel cell

SHIPPING WEIGHT: 21 lbs.

DARK TIME ENDURANCE: Fully-charged system will function for 21 days in darkness.

SPARK INTERVAL: 1.5 seconds

SPARK PLUG TYPE: LSC SparkPilot™;

SPARKPILOT™ GAP: 0.045 - 0.050 inch

SPARKPILOT™ REPLACEMENT FREQUENCY (average): greater than 1 year

IGNITION WIRE: 7 mm metallic wire insulated ignition cable with crimped eyelet terminals

IGNITION WIRE INSULATORS: Molded polyethylene with stainless steel clamps

FLAME ZONE SPARK STRAP: 1/8" stainless steel

GROUNDING STAKE: Galvanized steel with eyelet terminal

II. SEI-200 SOLAR IGNITION SYSTEM (12-volt system)

SOLAR COLLECTOR: 13" X 13" Solar-electric trickle charge plate; 6W panel providing 18V peak with 13V at 300mA normal charging power

BATTERY TYPE & VOLTAGE: 12-volt rechargeable gel cell

SHIPPING WEIGHT: 31 lbs.

DARK TIME ENDURANCE: Fully-charged system will function for 14 days in darkness.

SPARK INTERVAL: 1.25 seconds

SPARK PLUG TYPE: LSC SparkPilot™;

SPARKPILOT™ GAP: 0.045 - 0.050 inch

SPARKPILOT™ REPLACEMENT FREQUENCY (average): greater than 1 year

IGNITION WIRE: 7 mm metallic wire insulated ignition cable with crimped eyelet terminals

IGNITION WIRE INSULATORS: Molded polyethylene with stainless steel clamps

FLAME ZONE SPARK STRAP: 1/8" stainless steel

GROUNDING STAKE: Galvanized steel with eyelet terminal

III. CE-5 GAS VENT FLARE

SHIPPING WEIGHT: 75 lbs.

COMBUSTION FLAREHEAD: Patented double expansion gas/air mixing chamber; 2" inlet, 8" outlet. Heavy carbon steel construction with high-wind carburetion profile. Two SparkPilot™ taps for extra low or normal gas flows and for optional redundant safety ignition system.

FLAME ARRESTER: Three-inch diameter inline stainless steel wire-gauze flame arrester. Flame arrester elements should be replaced approximately every twelve months depending upon gas moisture and corrosivity.

The flame arrester is sized to absorb the flame front heat and, thus, extinguish a momentary back flash flame at the specified gas qualities and flow conditions.

HEIGHT: 96" inlet to top of flarehead (add ground height of flange to determine ground height of flame).

TRANSMISSION PIPES: 1½" ID Black steel Schedule 40 standard pipes with NPT thread.

BALL VALVE: 1½" ID Carbon steel body with stainless steel inner trim and ball valve.

BASE BUSHING: Schedule 40 black steel reducer bushing to 4" male NPT threads. This bushing is subsequently mated to the specific flange adapter required for local application.

IV. FLARE WARRANTY: One-year warranty on all parts.



LANDFILL GAS VENT FLARE LIST PRICE

PRODUCT	DESCRIPTION	LIST PRICE
CF-5 Vent Flare (6-volt)	Features a 1-½" inch diameter gas riser with 6-volt solar ignition, stainless steel ball valve, heat shield, 8" double expansion flarehead, Model 78 Spark Pilot™	\$2,437.50
CF-5 Vent Flare (12-volt)	Features a 1-½" inch diameter gas riser with 12-volt solar ignition, stainless steel ball valve, heat shield, 8" double expansion flarehead, Model 78 Spark Pilot™	\$2,568.75
CF-10 Vent Flare (6-volt)	Features a 2" inch diameter gas riser with 6-volt solar ignition, stainless steel ball valve, heat shield, 8" double expansion flarehead, Model 78 Spark Pilot™	\$2,956.25
CF-10 Vent Flare (12-volt)	Features a 2" inch diameter gas riser with 12-volt solar ignition, stainless steel ball valve, heat shield, 8" double expansion flarehead, Model 78 Spark Pilot™	\$3,081.25

ACCESSORIES AND SPARE PARTS

PRODUCT	DESCRIPTION	LIST PRICE
SPV-50 Series Solar Powered Vacuum	For use with Solar-Spark Vent Flares; an in-line fan that assists with the ventilation of landfill gasses	\$4,031.25
Guy Wire Kit	If additional stability is necessary this kit provides all hardware required for 3 stainless steel guy wire cables. (Includes ground stakes).	\$109.93
Model 78 Spark Pilot™	All-weather spark device for either 6-volt or 12-volt ignition system.	\$152.25
Stainless Steel Flame Arrester	Replacement Element	\$71.89
6-Volt Gel Cell Battery	6-volt Ignition	\$52.65
12-Volt Gel Cell Battery	12-volt Ignition	\$80.47
6-Volt Taper Charger	To recharge 6-volt gel cell from 120-volt source.	\$28.76
12-Volt Taper Charger	To recharge 12-volt gel cell from 120-volt source.	\$38.69
Stainless Steel Flame Shield	Screens visibility of flame zone. Includes mounting hardware.	\$604.18
Cold Weather Insulation Kits	Latex coated Armacell insulation. Prevents freezing of condensate in gas riser pipes. Fits 9", 11", or 13" diameter flange connections.	\$367.09
Flange Adapters	A wide range of adapters and flanges are available in several sizes to meet various mounting situations. Standard items include HDPE Hugger Flanges, PVC Glue Socket Flanges, and Steel Companion Flanges. Accessories are also available for custom offset type mountings.	Call for details.
Thermo Couple/Flame Pilot Data Logger (FTD) Kit	Type K thermo couple, stainless steel pilot tube, Omega Nomad portable data logger, USEPA approved for WWW, NSPS/EG sites.	\$780.07
Data Logger Software	For PC download and data handling from FTD kit.	\$189.28

All prices listed in US dollars. Prices exclude shipping, handling and applicable taxes.



2183 Pennsylvania Avenue Apalachin, NY 13732 Ph: 607-625-3050 Fx: 607-625-2689 www.landfill.com

Attachment B
Leachate Well Pump Information

AP4B

AutoPump®

Bottom Inlet, Short

Max. Flow 13 gpm (49 lpm)

O.D. 3.5 in (8.9 cm)

Length 41 in. (104 cm)



Description

The AP4 Bottom Inlet Short AutoPump provides maximum capabilities and flow in a bottom inlet pump for 4" (100 mm) diameter and larger wells with shorter water columns and/or the need to pump down to lower water levels, compared to full-length pumps. It is offered in optional versions to handle even the most severe remediation and landfill pumping applications, and delivers flow rates up to 13 gpm (49 lpm)*. The AP4 Short Bottom Inlet AutoPump is complemented by the most comprehensive selection of accessories to provide a complete system to meet site specific requirements. Call QED for prompt, no-obligation assistance on your pumping project needs.

The AutoPump Heritage

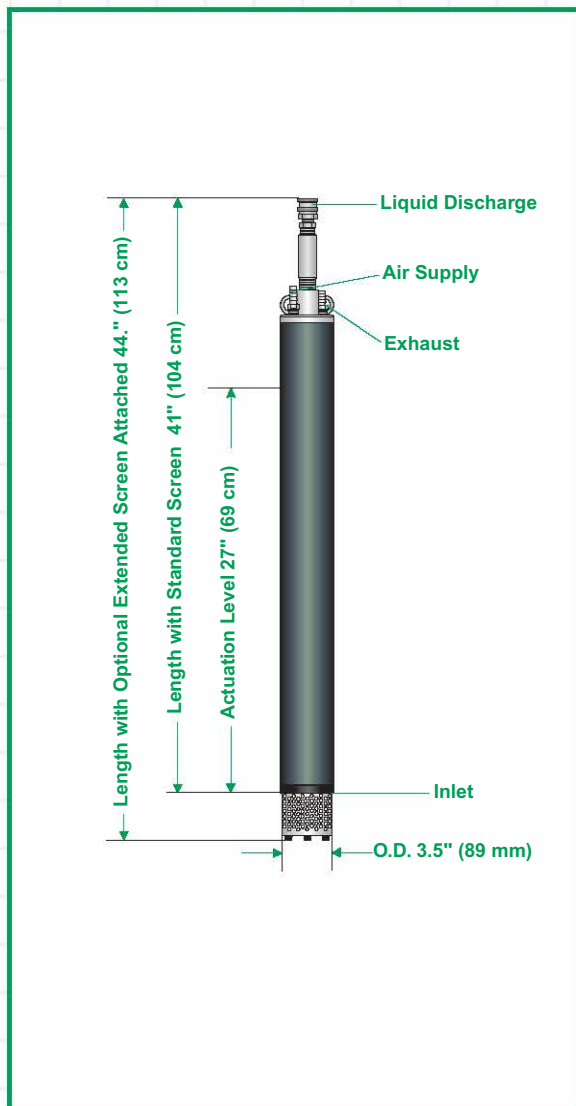
The AP4 Bottom Inlet Short AutoPump is part of the famous AutoPump family of original automatic air-powered pumps, developed in the mid 1980s specifically to handle unique pumping needs at remediation and landfill sites. Over the years they've proven their durability at thousands of sites worldwide. AutoPumps are designed to handle difficult pumping challenges that other pumps can't, such as hydrocarbons, solvents, suspended solids, corrosives, temperature extremes, viscous fluids and frequent start/stop cycles. Beyond just the pump, AutoPump systems offer the most complete range of tubing, hose, connectors, wellhead caps and accessories to help your installation go smoothly. This superior pumping heritage, application experience and support back up every AutoPump you put to work on your project.

Advantages

1. The original automatic air-powered well pump, proven worldwide over 18 years
2. The highest flow rates and deepest pumping capabilities in the industry
3. Patented, proven design for superior reliability and durability, even in severe applications
4. Handles solids, solvents, hydrocarbons corrosive conditions, viscous fluids and high temperatures beyond the limits of electric pumps
5. Five-year warranty

*Consult QED for higher flow requirements

Pump Dimensions



Specifications & Operating Requirements

Model	4" - Short AP4 Bottom Inlet
Liquid Inlet Location	Bottom
OD	3.5 in. (8.9 cm)
Length Overall (pump & fittings)	41 in. (104 cm)
Length Overall, w / Extended Screen	44 in. (112 cm)
Weight	13 lbs. (5.9 kg)
Max. Flow Rate	13 gpm (49 lpm)* - See Flow Rate Chart
Pump Volume / Cycle	0.22 - 0.36 gal. (.83 - 1.36L)
Min. Actuation Level	27 in. (69 cm)
Standard Pump	
Max. Depth	250 ft. (76 m)
Air Pressure Range	5 - 120 psi (0.4 - 8.4 kg/cm ²)
Air Usage	0.4-1.5 scf / gal. (1.5 - 5.7 liter of air / fluid liter) - See air usage chart
High Pressure Pump	
Max. Depth	425 ft. (130 m)
Air Pressure Range	5 - 200 psi (0.4 - 14.1 kg/cm ²)
Min. Liquid Density	0.7 SpG (0.7 g/cm ³)
Standard Construction Materials¹	
Pump Body	Fiberglass or Stainless Steel
Pump Ends	Stainless Steel, UHMWPE ³ , Brass
Internal Components	Stainless Steel, Viton, Acetal, PVDF ⁴
Tube & Hose Fittings	Brass or Stainless Steel
Fitting Type	Barbs or Quick Connects
Tube & Hose Options	
Tubing Material²	Nylon
Sizes - Liquid Discharge	1 in. (25 mm) or 1-1/4 in. (32 mm) OD
Pump Air Supply	1/2 in. (13 mm) OD
Air Exhaust	5/8 in. (16 mm) OD
Hose Material	Nitrile
Sizes - Liquid Discharge	3/4 in. (19 mm) or 1 in. (25 mm) ID
Pump Air Supply	3/8 in. (9.5 mm) ID
Air Exhaust	1/2 in. (13 mm) ID

¹ Material upgrades available

² Applies to QED supplied tubing; other tubing sources may not conform to QED fittings.

³ UHMWPE - Ultra High Molecular Weight Polyethylene

⁴ PVDF - Polyvinylidene Fluoride

Application Limits (Base model)

AP4 AutoPumps are designed to handle the application ranges described below. For applications outside these ranges, consult QED about AP4 upgrades.

Maximum Temperature: 150°F (65°C)

pH Range: 4-9

Solvents and Fuels: diesel, gasoline, JP1-JP6, #2 heating oils, BTEX, MTBE, landfill liquids

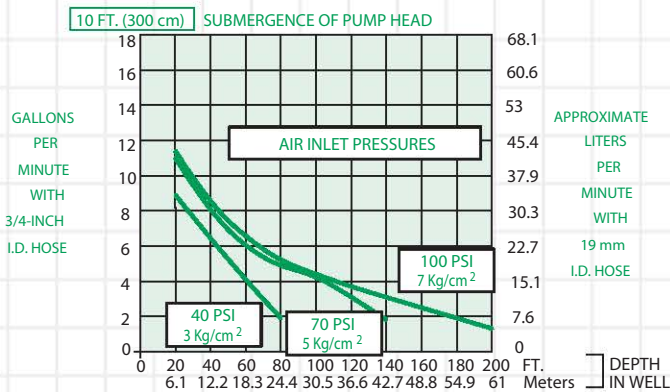
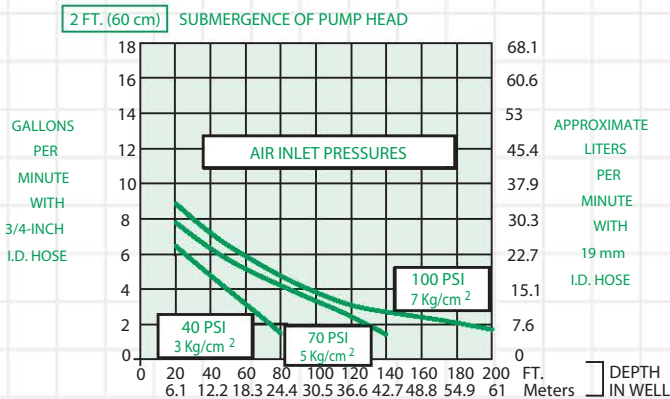
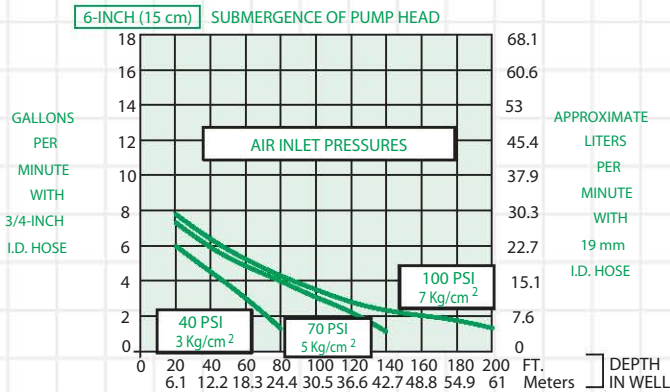
***Consult QED for higher flow requirements**

Long and short AP-4 AutoPumps are warranted for five (5) years: 100% materials and workmanship first three (3) years; 50% materials and workmanship for the fourth (4th) and fifth (5th) years.

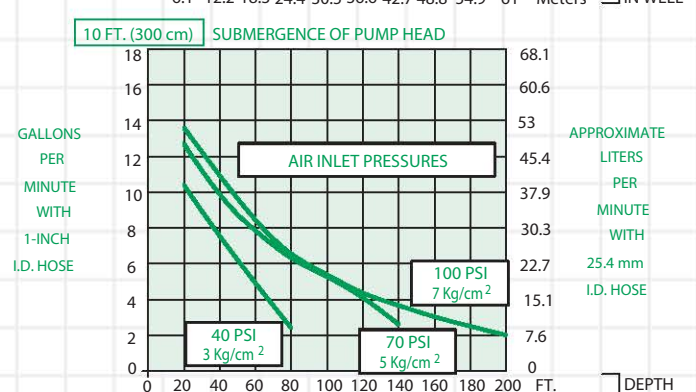
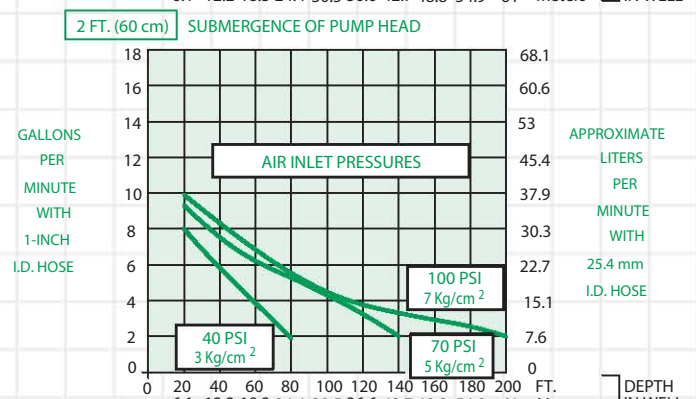
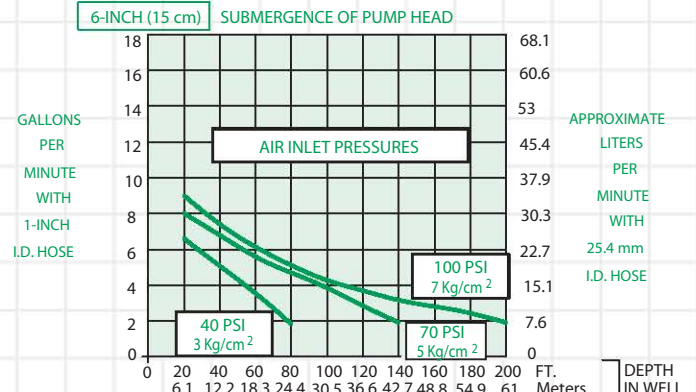
Low-Drawdown for the AutoPumps are warranted for one (1) year.

Flow Rates¹

**3/4 inch (19 mm)
Inside Diameter Discharge Hose**
(Equivalent to 1-Inch O.D. Tubing)



**1 inch (25.4 mm)
Inside Diameter Discharge Hose**
(Equivalent to 1.25-Inch O.D. Tubing)

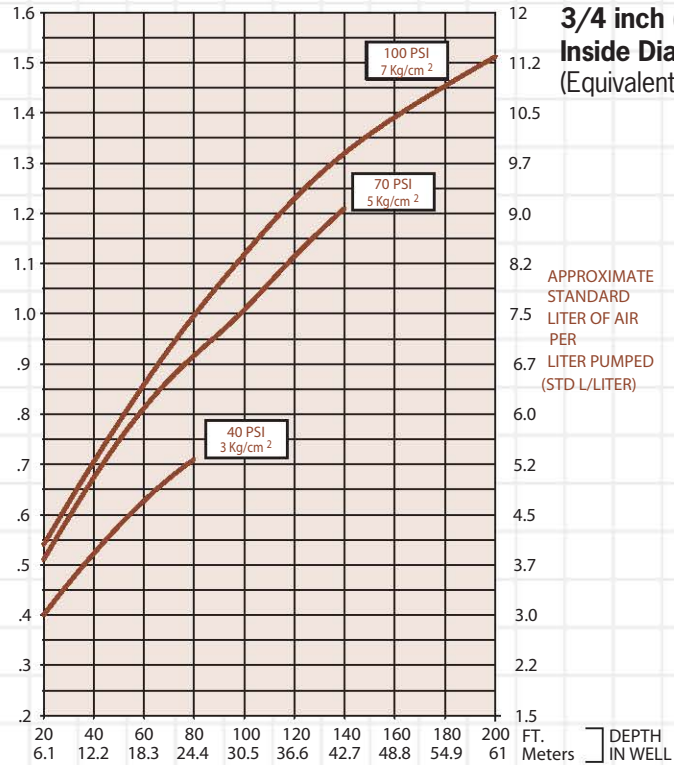


¹FLOW RATES MAY VARY WITH SITE CONDITIONS. CALL QED FOR TECHNICAL ASSISTANCE.

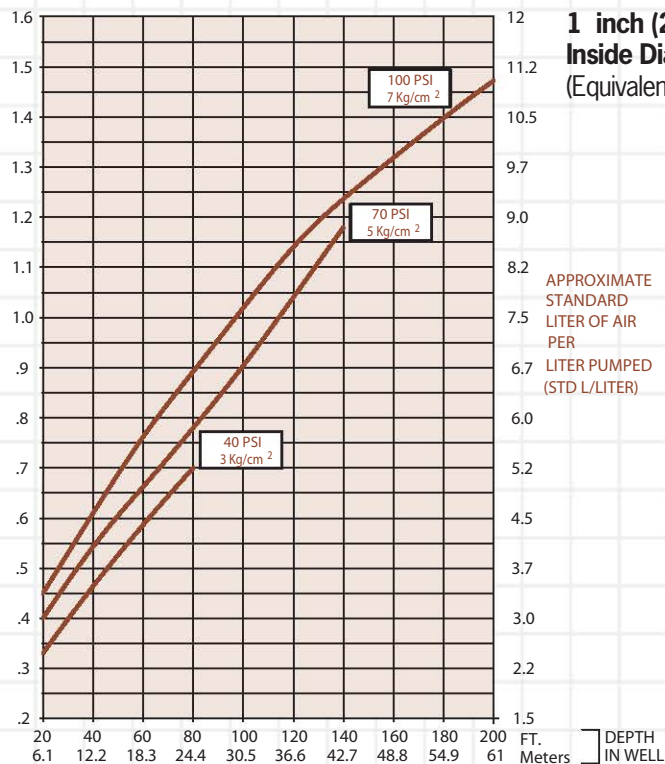
Air Consumption



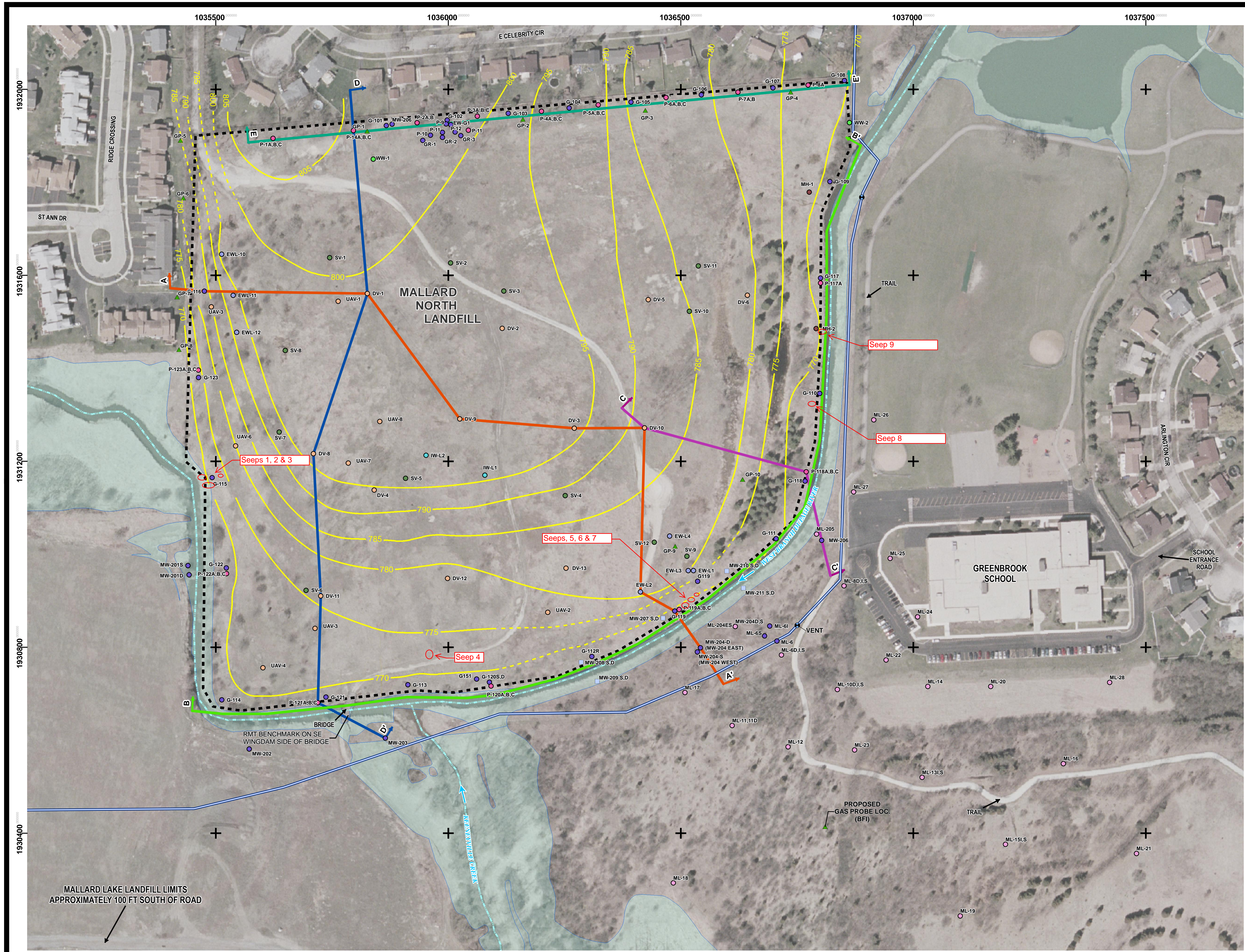
STANDARD
CUBIC FEET OF AIR
PER
GALLON PUMPED
(SCF/GAL)



STANDARD
CUBIC FEET OF AIR
PER
GALLON PUMPED
(SCF/GAL)



Attachment C
Landfill Seep Locations



LEGEND

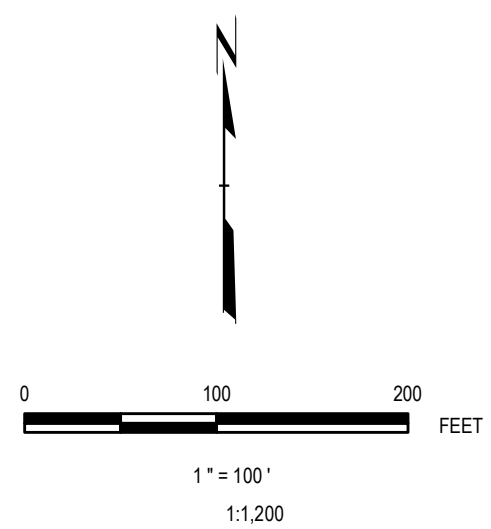
- APPROXIMATE LANDFILL LIMITS
- WATER TABLE LINE
- PRIVATE WELLS
- MONITORING WELLS
- PIEZOMETERS
- LEACHATE PIPE
- GAS VENTS
- GAS VENTS (P)
- GAS EXTR HEAD WELLS
- LEACH GAS EXTR WELLS
- GAS PROBES
- PROPOSED GAS PROBE
- PROPOSED GW MON WELL
- FEMA 100-YR FLOOD PLAIN
- APPROXIMATE RIVER & STREAM CENTERLINES
- EXISTING 16" FORCE MAIN
- FORCE MAIN VENT

CROSS SECTIONS

- A-A'
- B-B'
- C-C'
- D-D'
- E-E'

NOTES

- BASE AERIAL IMAGE FROM THE USGS SEAMLESS DATA SERVER, MARCH 2005.
- ROADS DATA FROM ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE.
- LANDFILL LIMITS AND HYDRO FEATURE CENTERLINES ESTIMATED BY AERIAL PHOTOGRAPH.
- SAMPLE LOCATION DATA FROM MARTINEZ CORPORATION.
- MAP PROJECTION & COORDINATE SYSTEM IS ILLINOIS STATE PLANE EAST NAD83.
- WELL AND PROBE APPROXIMATE LOCATIONS FROM DUPAGE CO FOREST PRESERVE DISTRICT AND BFI.



PROJECT: MALLARD NORTH LANDFILL FOREST PRESERVE DISTRICT DU PAGE COUNTY, ILLINOIS			
SHEET TITLE: LANDFILL GAS INVESTIGATION WORK PLAN WATER TABLE MAP (MARCH 9 & 10, 2009)			
DRAWN BY: BENTON K		SCALE:	PROJ. NO. 00-06809.03
CHECKED BY: JCK		AS NOTED	FILE NO. 68090301
APPROVED BY: <u>AJS</u>		DATE PRINTED:	FIGURE 7
DATE: APRIL 2009		4/3/2009	
744 Highland Trail Madison, WI 53717-1934 <hr/> P.O. Box 8923 53708-8923 Phone: 608-831-4444 Fax: 608-831-3334			